

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1 1. (Previously Amended) A method of manufacturing a trench field effect
2 transistor on a substrate having a first conductivity type, the method comprising the steps of:
3 forming a first trench extending into the substrate;
4 lining the first trench with dielectric material;
5 substantially filling the first trench with conductive material to form a gate
6 electrode of the field effect transistor;
7 forming a body region having a second conductivity type in the substrate;
8 after substantially filling the first trench with conductive material, forming a
9 source region having the first conductivity type inside the body region and adjacent to the first
10 trench;
11 forming a second trench adjacent to said source region, the second trench defined
12 by sidewalls extending into the body region and a bottom, which terminates below the source
13 region and in contact with the body region; and
14 filling the second trench with high conductivity material for making contact to the
15 body region.

1 2. (Original) The method of claim 1 wherein the step of filling the second
2 trench with high conductivity material for making contact to the body region also makes contact
3 to the source region.

1 3. (Original) The method of claim 2 wherein the step of filling the second
2 trench with high conductivity material comprises a self-aligned masking step for making contact
3 with both the body region and the source region.

1 4-5. (Previously canceled)

1 6. (Original) The method of claim 2 further comprising a step of forming a
2 thin layer of barrier metal between the high conductivity material and the body region.

1 7. (Original) The method of claim 6 wherein the high conductivity material
2 comprises aluminum and the thin layer of barrier metal comprises titanium.

1 8. (Original) The method of claim 2 wherein the step of forming the second
2 trench comprises a step of etching silicon through the source and body regions.

1 9-11. (Previously Canceled)

1 12. (Original) The method of claim 8 wherein the step of etching etches the
2 silicon at an angle resulting in a slanted edge along the etched side of the source region.

1 13. (Previously Amended) A process for manufacturing a trench field effect
2 transistor comprising the steps of:
3 etching a first trench in a substrate having a first conductivity type;
4 lining the first trench with a layer of dielectric material;
5 substantially filling the first trench with polysilicon;
6 implanting impurities of a second conductivity type into the substrate to form a
7 body region having the second conductivity type over the substrate;
8 after substantially filling the first trench with polysilicon, implanting impurities of
9 the first conductivity type inside the body region to form a source region adjacent to the first
10 trench;
11 etching a second trench through the source region and into the body region, the
12 second trench defined by sidewalls and a bottom, which terminates in contact with the body
13 region; and
14 filling the second trench with metal making contact with both the source region
15 and the body region.

1 14. (Original) The process of claim 13 further comprising a step of implanting
2 impurities of the second conductivity type into the body region under the second trench before
3 the step of filling the second trench with metal.

1 15. (Original) The process of claim 13 wherein the step of etching the second
2 trench etches the second trench to a shallower depth than the first trench.

1 16-17. (Previously Canceled)

1 18. (Previously Added) The method of claim 1, wherein the first trench is
2 substantially completely filled with conductive material.

1 19. (Previously Added) The method of claim 1, wherein after filling the first
2 trench with conductive material, the conductive material does not extend over a substantial
3 portion of the substrate surface peripheral to the first trench.

1 20. (Previously Added) The method of claim 13, wherein the first trench is
2 substantially completely filled with polysilicon.

1 21. (Previously Added) The method of claim 13, wherein after filling the first
2 trench with polysilicon, the polysilicon does not extend over a substantial portion of the substrate
3 surface peripheral to the first trench.